

COMPONENTS

FAQ

Q What does a physics card do? Do I need one?

A Physics calculations in games, such as deciding how a stack of boxes should react to being knocked over, are hard to compute. Traditionally, even the games that say they have realistic physics engines don't have a lot of environment with which to interact.

A physics card is designed to offload these complex calculations to a dedicated processor. Physics cards can also be used to generate more realistic effects, such as a curtain blowing in the wind or water rippling.

Currently, Ageia is the only company to make the hardware with its PhysX card, although Nvidia is rumoured to be launching its own physics hardware in the near future. Games have to be specifically written to use extra physics hardware, and few titles currently are. A physics card isn't essential at the moment, as no games require one.

David Ludlow
Deputy Editor



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SAPPHIRE X1950 GT

★★★★★

£105 inc VAT



ATI has been doing a great job recently of producing inexpensive graphics chips that can handle high-resolution, high-detail gaming. We've been wowed by the Radeon X1950 Pro (see Gigabyte's GV-RX195P256D-RH in 'Also consider...' below). This month, however, we've got an even cheaper card that promises similar performance: Sapphire's X1950 GT.

This is the first card we've reviewed to use ATI's new Radeon X1950 GT graphics chip. It's a slightly cut-down version of the X1950 Pro. The X1950 GT has the same 36 pixel pipelines, while a core speed of 500MHz and 256MB of GDDR3 memory running at 600MHz (1.2GHz effective) isn't far off the X1950 Pro's 575MHz core speed and 256MB of GDDR3 memory running at 690MHz (1.38GHz effective). These small clock speed differences shouldn't make much difference when it comes to running games.

To see what the card is capable of, we put it through our demanding games tests at a resolution of 1,280x1,024. As you can see from the results graph below, the X1950 GT did extremely well. Its results weren't far off those of Gigabyte's GV-RX195P256D-RH (see 'Also consider...' below). The true measure of a modern graphics card is how well it copes with higher resolutions, though, so we re-ran our tests at 1,600x1,200. The 31.7fps in Call of Duty 2 and 40.8fps in Doom 3 are excellent, and show that this card can easily cope with high-resolution gaming. However, it may start to struggle with newer games at 1,600x1,200 with high detail settings, as it doesn't have as much headroom as X1950 Pro graphics cards.

The X1950 GT is a DirectX 9 graphics card, so it won't run



DirectX 10 games when they are released. However, DirectX 10 only works under Windows Vista and there aren't many graphics cards that support it, so it will be a couple of years before this card is out of date.

Like all ATI's recent graphics cards, Sapphire's X1950 GT supports internal CrossFire. As with Nvidia's SLI, this uses an internal connector to join two graphics cards together to increase performance.

The X1950 Pro graphics cards we've reviewed had large, silent cooling fans on them; Sapphire's X1950 GT uses a traditional heatsink and fan. While not silent, the card takes up only a single slot, so it will fit inside most cases. With dual DVI outputs (HDCP compatible) and TV out (S-video and component), there's the usual range of outputs you'd expect to find in a modern graphics card.

Gigabyte's GV-RX195P256D-RH is a slightly better card and has a bit more headroom for newer games, but if you're on a tighter budget you'll find that Sapphire's X1950 GT is excellent value and shows that you don't have to spend a fortune to get quick graphics.

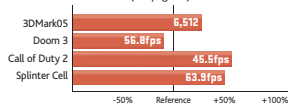
David Ludlow

SUMMARY

- ✓ Excellent value
- ✓ Good games performance
- ✗ Almost as dear as an X1950 Pro

GRAPHICS CARD ATI Radeon X1950 GT, PCI-E x16 interface, 36 pixel pipelines, 256MB GDDR3 memory running at 600MHz (1.2GHz effective), 500MHz core speed, two DVI, TV-out
PART CODE 11103-00-20R
SUPPLIER www.morecomputers.co.uk
DETAILS www.sapphiretech.com

PERFORMANCE (see page 54)



Also consider...

INTEL Core 2 Duo E6700

★★★★★

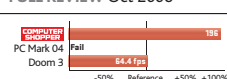
£337 inc VAT



Intel's new processor is based on the company's mobile technology. It is designed to be much more efficient than the P4. It's incredibly quick, achieving some of the highest benchmark results we've ever seen. You'll need a new Intel 965 or 975-based motherboard to use the E6700, but it's worth every penny, as it's by far the best-value processor you can buy.



PROCESSOR Two cores running at 2.66GHz, LGA775, 267MHz external bus, 4MB L2 cache
PART CODE BX805576700
SUPPLIER www.scan.co.uk
DETAILS www.intel.com
✓ Extremely fast; great value
FULL REVIEW Oct 2006



GIGABYTE GV-RX195P 256D-RH

★★★★★

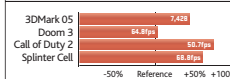
£136 inc VAT



Gigabyte's Radeon X1950 Pro-based graphics card uses a Zalman VF700 cooler, so it's silent as well as powerful. It's incredibly fast, tearing through our games tests with an impressive score of 50.7fps in Call of Duty 2. The price is unbelievable. This is the best-value graphics card you can buy.



GRAPHICS CARD ATI Radeon X1950 Pro, PCI-E x16 interface, 36 pixel pipelines, 256MB GDDR3 memory running at 700MHz (1.4GHz effective), 600MHz core speed, two DVI, TV-out PART CODE GV-RX195P256D-RH
SUPPLIER www.lambdatek.com
DETAILS www.gigabyte.com.tw
✓ Excellent performance
✗ Fan quite bulky
FULL REVIEW Mar 2007



MSI

Crystal 945

★★★★

£470 inc VAT

EXCLUSIVE

Even a mini PC takes up quite a lot of room with its separate base unit and monitor, not to mention the mess of cabling involved. MSI's Crystal 945 barebones kit hopes to offer an altogether neater system, with a single unit that houses the 17in LCD and the PC, in a similar way to the iMac.

Stylistically, the Crystal 945 isn't as good-looking as the iMac. Its boxy appearance and silver edges aren't as attractive. However, put it on a desk and slide it back, and the Crystal looks neat and tidy. With nothing else needed, it's amazing how much desk space it frees up.

To use it, you first have to build it. It's quite simple to get inside, as a set of screws detaches the screen and components from the stand. From here, though, you have to remove two metal cages to get to the memory slots and processor. The memory is simple to fit, as there are two regular DDR2 DIMM slots available. The processor is more involved, as the socket sits under a passive heatsink linked to a fan unit by heat pipes. Both have to be removed to gain access to the LGA775 socket. You're limited in your choice of processor. The 945G chipset that the Crystal uses supports only Celeron D, Pentium 4 and Pentium D processors (not Core 2 Duos). To us this is a strange choice, as the Core 2 Duo is faster and also runs cooler than the Pentium D.

We started off by installing a Pentium 4 560 (3.6GHz) processor, but this caused lots of problems, as the Crystal's cooling system isn't very effective. With the fans running at full speed, which was very noisy, our processor ran at 71°C and we couldn't even get Windows to install as the setup application kept crashing. We switched to an Intel Celeron D 2.66GHz processor. This processor runs a lot cooler, and



the Crystal's fans span at a lower speed and were also much quieter.

The Crystal uses a notebook optical drive and hard disk. While these take up less space than their desktop equivalents, they're more expensive. You can expect to pay around £40 for a notebook DVD writer and around £50 for a 100GB 2½in PATA hard disk, which is the same price as a 200GB PC hard disk. The small case means you can't add a dedicated graphics card or internal expansion cards. It's good to see, then, that MSI has included two PC Card slots. These can be used for a WiFi card or TV tuner.

Performance using our 2.66GHz Celeron D processor gave us a score similar to our reference PC. There's enough power for desktop and internet applications, but if you want to do anything more serious, such as video editing or image editing, you'll need a computer than can take a faster processor.

Fortunately, the 17in LCD is quite good. An old-fashioned wheel, as you'd expect to find on a CRT, controls the monitor's brightness. We really

like it, and the monitor has a greater range of brightness than other LCDs we've reviewed. The picture is very sharp, too, with good colour reproduction. Horizontal viewing angles are brilliant, but the vertical viewing angles mean the picture rapidly degrades when you stand up.

A pair of speakers is built into the bottom of the display's bezel. They're fine for Windows sounds, but you'll want a decent pair of speakers for anything more serious. It's also a shame that there's no dedicated volume control; you have to use the Windows System Tray icon to turn them up or down.

The Crystal is a good idea in theory, particularly if you haven't much desk space. However, the choice of a 945G motherboard is disappointing. A newer chipset with Core 2 Duo support, such as the 945GM, would have made more sense, particularly as heat is a big problem inside this barebones PC's constricted interior.

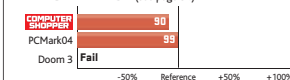
David Ludlow

SUMMARY

- ✓ Takes up little room
- ✗ Doesn't support Core 2 Duo
- ✗ Runs quite hot

BAREBONES PC Intel 945G chipset, supports Intel LGA775 processors (except Core 2 Duo), 17in LCD, four USB2 and Ethernet ports, two DIMM slots, one 2½in drive bay, notebook optical drive bay, 220W power supply, two 1.5W stereo speakers
PART CODE MS-6422-010
SUPPLIER www.zomp.net
DETAILS www.msi.com.tw

PERFORMANCE (see page 54)

ANTEC
P150

★★★★★

£92 inc VAT



Antec's white steel P150 case looks great on the desk and is built to keep your PC silent. It doesn't rattle, has acoustic insulation and the hard disks screw into rubber grommets to prevent echoing vibrations. A silent Antec Neo HE 430W modular power supply is also included, all of which make this case excellent value.



SILENT PC CASE ATX case, 120mm fan, two USB2, one FireWire, two audio ports, two 5¼in drive bays, one external 3½in drive bay, four internal 3½in drive bays
PART CODE 0761345-019151-0
SUPPLIER www.morecomputers.com
DETAILS www.antec.com
 ✓ Attractive; comes with power supply
 ✓ Drive bays hard to access
FULL REVIEW Mar 2006

SAPPHIRE
X1950 Pro AGP

★★★★★

£148 inc VAT



Sapphire's X1950 Pro AGP is the best-value

graphics card for AGP systems. Storming through all our games tests, it performed very close to its PCI-E equivalent. This is the best card to give your old AGP system a graphical boost for the latest games.



AGP GRAPHICS CARD ATI Radeon X1950 Pro, AGP 8x interface, 36 pixel pipelines, 512MB GDDR3 memory running at 690MHz (1.38GHz effective), 575MHz core speed, two DVI, TV out
PART CODE 11095-03-20R
SUPPLIER www.novatech.co.uk
DETAILS www.sapphiretech.com
 ✓ Excellent performance and great price
FULL REVIEW Apr 2007

ZEROTHERM
CF800

★★★★★

£20 inc VAT

If you want to replace your LGA775 cooler, ZeroTherm's CF800 is a good choice. The low-profile cooler and fan kept our Core 2 Duo E6300 processor running 5°C cooler under load than the reference Intel cooler. Its automatic fan speed adjustment should help ensure that your PC is quieter, too.



PROCESSOR COOLER Supports Intel LGA775 processors, 90mm fan, 800-2,300rpm spin speed, 16-30dBA operating volume
PART CODE CF800
SUPPLIER www.quietpc.com
DETAILS www.zerotherm.net
 ✓ Good value; automatic fan-speed adjustment
 ✓ Standard Intel cooler has similar performance
FULL REVIEW Apr 2007

FOXCONN N68S7AA

★★★★

£140 inc VAT

ECS PN2 SLI2+

★★★★★

£164 inc VAT

Nvidia always used to release its chipsets for AMD's processors first. Now AMD owns Nvidia's biggest rival, ATI, the tables have turned and the newer chipsets are coming to Intel's processors first. We've looked at Foxconn's N68S7AA and ECS's PN2 SLI2+ motherboards, both of which use Nvidia's high-end nForce 680i chipset.

The most noticeable thing about both motherboards is that they have three PCI-E x16 slots. Two of the slots run at full x16 speed and are for graphics cards in SLI mode. The third slot runs at x8 speed. This slot, it's widely expected, will be used for Nvidia's physics hardware (see FAQ). No firm details of how this hardware will work or what it will do have been released yet.

As this is Nvidia's flagship chipset, both motherboards support the full range of Intel's processors. The 680i chipset also supports processors with a frontside bus (FSB) speed of 1,333MHz; the previous generation of chipsets support processors only with a 1,066MHz FSB. Memory is still limited to DDR2 800MHz, although Nvidia claims that using self-configuring 'SLI-ready' memory will increase bandwidth.

Overclocking is important for high-end boards, and both the N68S7AA and PN2 SLI2+ have excellent support. There's a choice of the Ntune Windows application, which can use wizards to configure your components for speed or quietness automatically, or the BIOS, which is fully tweakable so you can configure settings manually. The range of settings is impressive. Memory and FSB speeds can be altered individually or linked, so changing the FSB speed automatically adjusts the

memory speed. Even the individual clock speeds of each of the PCI-E x16 slots can be adjusted.

To ensure that its motherboard stays cool even when it has been overclocked, Foxconn has fitted its N68S7AA with two fans. The larger of the two looks like a turbine and sticks out of the top of the motherboard. At full power the sound that these two fans make is quite noticeable.

ECS has decided to cool its motherboard passively. However, a fan is provided that clips on to the main heatsink on the Northbridge, which you have to use if you overclock. Still, one fan compared to two is better, and if you're just planning to run your PC at standard settings the PN2 SLI2+ is silent.

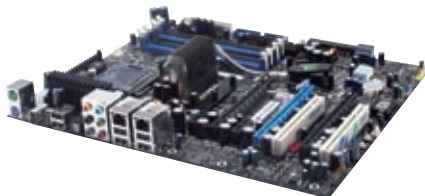
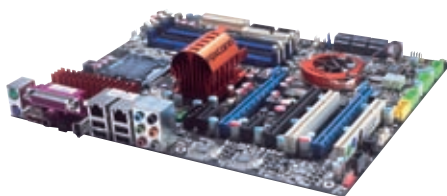
When it comes to expansion, both boards are equally matched with two PCI-E x1 and two PCI slots. There's a similar number of ports, too; both boards have six USB2 ports, eight-channel audio, FireWire and two Gigabit Ethernet ports. As with previous nForce boards DualNet can be used so the network ports are combined into one 2GB/s pipe. Six SATA2 ports can be used in a RAID configuration, so there's plenty of room for storage.

ECS jumps slightly ahead of Foxconn when it comes to what is included in the box. As well as providing a full set of cables for all the ports, ECS also provides a blanking plate with two USB2 and one FireWire ports that can be attached to a spare header on the motherboard. There's also a 3½in adaptor for these ports, so you can front-mount them, too.

Foxconn merely supplies a blanking plate with FireWire and mini FireWire ports, and a serial port. Performance, as you can see from our graphs, was very similar, although ECS's PN2 SLI2+ was marginally quicker in all our tests.

With the nForce 680i, Nvidia has created the most powerful chipset available for Intel processors. The PN2 SLI2+ is the better of the two boards reviewed here, providing excellent performance and a huge range of expansion options. If you're planning to overclock your PC, it's a great choice. If you're not interested in overclocking and want a stable, feature-packed motherboard, we'd be tempted to wait for the cheaper nForce 650i chipset.

David Ludlow



FOXCONN SUMMARY

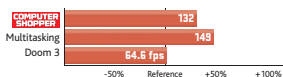
- ✓ Good performance
- ✓ Good overclocking
- ✗ Cooling fans can be loud

INTEL MOTHERBOARD Nvidia Nforce 680i chipset, supports Intel LGA775 processors, two PCI, two PCI-E x1, three PCI-E x16 slots, four DIMM slots, two Gigabit Ethernet, four USB2, eSata and FireWire ports

SUPPLIER www.foxconnchannel.com, 01908 276610

DETAILS www.foxconnchannel.com

PERFORMANCE (see page 54)



ECS SUMMARY

- ✓ Excellent performance
- ✓ Good overclocking
- ✗ Expensive

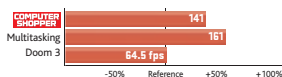
INTEL MOTHERBOARD Nvidia Nforce 680i chipset, supports Intel LGA775 processors, two PCI, two PCI-E x1, three PCI-E x16 slots, four DIMM slots, two Gigabit Ethernet, four USB2, eSata and FireWire ports

PART CODE PN2 SLI2+

SUPPLIER www.scan.co.uk

DETAILS www.ecs.com.tw

PERFORMANCE (see page 54)



CHOOSING A... Barebones System

Follow the steps to find your ideal specs

PROCESSOR SUPPORT: AMD Socket AM2

HARD DISK SUPPORT: 2 SATA

EXPANSION SLOTS: 2 PCI

GRAPHICS: Onboard

EXTRAS: Memory card reader

Recommended minimum in grey

1 Buying a barebones system is a simple way of building your own computer, as you get a case with the motherboard already installed, and all the cables and instructions are designed specifically for your PC. All you need to do is add your own drives, processor, memory and, potentially, graphics card. A barebones system that supports the latest AMD Socket AM2 processors and has space for up to two hard disks and an optical drive will cost around £130.

2 As the motherboard is built in, you need to decide on the processor you want to buy before you choose your barebones case. If you want Intel support, you'll need an LGA775 socket. Check for Core 2 Duo support on the manufacturer's website if you want to use Intel's latest processors. For AMD systems, Socket 939 will support the older range of processors, which are good value now but harder to upgrade from; Socket AM2 will support all AMD's new processors.

3 If you just want a basic computer for office tasks, onboard graphics will save you money. If you want the option to upgrade to a dedicated graphics card to play games, look for a system that comes with a PCI-E x16 slot.

4 If you want to be able to install a wireless card, TV card or other expansion card, you'll need a system with free expansion slots. For now, make sure you get at least one PCI slot; PCI-E x1 slots aren't as well supported and you'll have more trouble finding a card to fit them.

5 How are you going to use your PC? If it's a second PC, a standard tower barebones will do the job. If space is at a premium, a mini PC is a more sensible option. If you're building for the living room, a barebones with hi-fi styling makes more sense. Whatever your choice, make sure there's enough room to fit all the hard disks, optical drives and expansion cards you want.